THE NORTHWEST PAVEMENT MANAGEMENT ASSOCIATION NEWSLETTER

'Government and Private Agencies Working Together for Better Pavements'

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April, 1997

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Volume 9, Number 1

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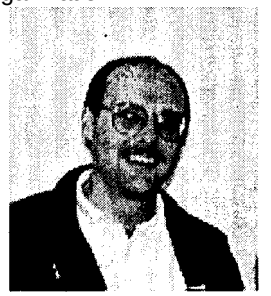
Words From The Chair

Greetings from Yakima County. As with most of you, things are starting to gear up for summer. Before we get too carried away with our summer time activities, I would like to sav a few words about one of the "founding fathers" of our organization.



After a long and distinguished career as Spokane County's Pavement Manager, Chad Cole is moving on to new and challenging things. Chad has recently accepted a promotion as the Spokane County Construction Engineer.

Chad has been a leader in local agency pavement management in Washington. He was one of the founders of the NDT (Road Ratters) Users Groups. It was under his leadership as chair of the joint steering committee that the NWPMA charter was created and the Association was established.

He has been active in promoting the NWPMA ideal of sharing pavement management technical information between all local agencies. He is one of the originators of the annual pavement management conferences, of which he was instrumental in hosting two. He has been active in each of the other conferences, as well as the Quarterly's, by providing presentations, and assisting with the development of conference agendas. He was also an active member of the technical team that produced the Interstate Automated Data Collection Evaluation, and provided technical assistance on the Pavement Management Applications Guide.

When I entered the world of pavement management two years ago, Chad was on of those people I immediately recognized as someone whom I could call with questions. It is this type of example of exchanging information and ideas that should be the model of what we are trying to accomplish with this organization.

Chad, we're all going to miss you. Hope you don't think you can drop completely out of sight. Remember... You can run but you cannot hide... you'll always be "Chairman-For-Life"!

Congratulations and best wishes on your career move! We greatly appreciate your hard work, patience and professionalism.

Matt Pietrusiewicz
NWPMA Chair

New Meeting Schedule For Puget Sound Chapter

The Puget Sound Chapter has regular meetings every month on the 2nd Wednesday. Please mark you calendars for the next year, every month on the 2nd Wednesday. The next 2 month's meetings have been decided and the schedules for these are:

May 14, 1997 - 10AM - Noon
Lewis County Public Services
350 N. Market Blvd.
Chehalis, WA 98532-2626
Please call Joanna Pottorff for directions
Her number is (360) 740-l 492

Topics:

To be scheduled

June 11, 1997 we will be in King County.

TransAid Offers Cities New PMS Software Option

Dan Sunde, Management Systems Engineer
TransAid, WSDOT

Over the past year, TransAid has been focused on developing a support mechanism for Pavement Management that is balanced between:

- maximizing the software options available to the agencies
- maximizing market availability for the vendors
- maintaining the established Washington PMS methodology, and
- honoring TransAid's commitment of replacing existing out dated software currently supported by TransAid.

TransAid has had extensive discussions with users and vendors, along with a lengthy internal evaluation concerning the most effective method for providing support to cities in pavement management and the other management systems.

The result is the implementation of a new method for supporting management system software for pavements, safety, and roadway inventories. Rather than replacing existing software directly, TransAid will provide a list of software that uses the pavement distresses and measurements, as defined in The Pavement Surface Condition Rating Manual and the Washington state deduct curves. Agencies then will be allowed a onetime subsidy (yet to be determined) if they choose to either start PMS or decide to replace their existing software with one of these "Washington-compliant" software packages. Criteria for PMS will be coordinated with TIB, CRAB, and AWC along with input from the NWPMA.

A list of "compliant" software will be posted on the Management System Internet home page and continuously updated.

Full implementation of the new process is expected by August 1997.

TransAid will honor the commitment to provide support to those agencies opting to continue using PaveSmart and Streetwise. TransAid will also continue to provide support to the states local agencies by supporting and encouraging involvement in NWPMA. The Service Center will also continue to provide training for pavement management implementation and operation, and development of resources to support pavement managers (i.e. manuals, articles in newsletters, technical information, etc.).

TransAid's new policy was formally announced in the TransAid Report March 19. 1997 and presented for discussion at the Washington State Association of County Engineers, March 27-28. The policy will also be presented to the City Engineers Association of Washington at APWA April 9, 1997 and Washington State Association of County Officials, April 10, 1997.

Is there a good time to seal asphalt cracks?

by J.H. LaVerne Palmer
Better Roads, Feb. 1997, pg. 37-8

Once an open crack in asphalt has formed, the space tends to open further in cold periods and to close in warm periods. Differential movement of the sides of cracks is called crack movement.

In general, there are three facets of crack movement:

1. Lateral movement primarily in response to thermal changes.
2. Vertical upward movement (lipping) at the crack, primarily due to frost action.
3. Vertical downward movement (cupping) primarily as a result of loss of structural integrity of the pavement due to water infiltration and other water-related damage.

If there has been little or no water penetration (the objective of a crack-sealing operation) then later movement will predominate.

Based on research, it is clear that in the northern hemisphere, most crack movement occurs in a 6- to 8-mo. period, with a peak opening about the end of February or early March.

Crack motion is generally consistent with temperature changes. Unfortunately, most reported data provide only an air temperature or pavement surface temperature. These don't always correlate with crack movements. The reason is that crack movements are a consequence of the changes in the thermal regime of the total pavement structure.

These changes are in proportion to the average daily temperature and are not necessarily a direct reflection of spot surface or air temperatures taken usually during the warmer part of the day. One researcher, Jean-Francois Mason, has shown an excellent correlation of temperature, measure somewhat below the pavement surface, versus

movement, by using a four-day running average temperature.

The magnitude of lateral crack movement is a function not only of temperature changes, but also other factors. These include environmental effects, aging, and type of mix.

You might assume that the magnitude of the crack opening might also be a function of the distance between adjacent cracks. There doesn't seem, however, to be a direct relationship between these factors.

In general, crack movements that have been monitored and reported in a cold climate are on the order of 0.1875 to 0.75 in. during an annual cycle. Data also show that if a crack is kept clear of debris, it will close to a residual opening of about 0.0625-in. greater than the opening that existed at the start of the season.

Seasonal effects

A recently published manual of practice by Kelly Smith and Romine Russell recommends that crack sealing should be conducted at a time of year when the temperatures are moderately cool (45 to 65 degrees F), such as in the spring or fall. However, it isn't uncommon in the northern states and in Canada to see crack-sealing operation during the summer months. Working conditions are pleasant, equipment and personnel are available, cracks have dried, and crack sealants can be maintained at optimum temperature for placement.

There is no doubt that sealant performance is very dependent on proper and consistent workmanship during crack preparation and the sealing operation, and that good workmanship is most likely to be achieved during good conditions. The SHRP manual points out that if cracks are sealed while partially open, it is easier to get the material into the crack, and the resulting seal will not have to undergo either excessive extension or contraction.

The accompanying figure shows that cracks are not 50% open until about December. Therefore, there is little advantage in delaying crack sealing to the fall months. And, there is the disadvantage of extending the period when infiltration and water damage can take place.

Sealing operations in the spring period, however, do have merit.

The major purpose of a crack-sealing operation is to prevent water infiltration. In the winter months, infiltration will occur during any thaw (or induced thaw from salt application).

The major ingress of water will occur during the spring thaw and typical spring and early summer rains, at a time when the crack opening is close to a maximum.

The problem with summer or fall crack sealing operations is that the worst of the water infiltration will already have taken place, and the cracks will have closed as much as can be achieved depending on debris in the crack.

Since the seal is installed with the crack at its minimum opening then, the sealant will be essentially under tensile stresses at all times. Sealants fail by paring or separation under a combination of traffic loading and increasing tensile deformation.

Ideal time

The ideal time of installation, from the point of view of minimizing damage to the pavement and of stress/strain operation of the sealant, is when the crack is nearly fully open.

Such a procedure results in a minimum of water infiltration and debris entry into the crack and the pavement structure.

In addition, the crack sealant can be expected to experience mainly compressive stresses in the first year and relatively little tensile stress in subsequent years. Under these conditions, even a relatively poorly installed sealant might provide a reasonable seal against water infiltration.

The implication is that in a northern climate, an optimum timing for crack sealing is about the end of February through mid-April.

Since the data indicate that the first portion of the annual crack closure takes place over a relatively short period of time, installation of crack sealants at maximum crack opening is not practical. In fact, most installations will experience some tensile loading, but still substantially less than for sealants installed in the summer or fall.

Potential problems

Most major roads are snow free in March and April. However, the pavement structure will be frozen and the cracks almost certainly will be wet.

This means that we need to develop a practical technique to clean and dry cracks adequately for current sealants, or to develop a sealant that will bond well to a clean, but wet and cold surface. This sealant should perform well under extreme temperature conditions.

Since most sealant testing and current experience with sealants in the field have been with materials working under tension, there is a question of what the performance will be of a sealant being compressed while being subjected to normal traffic loading.

The SHRP manual has suggested that an optimum situation might be to seal the crack at an opening of about 50% of maximum. That situation would reduce the probability of sealant bulge during compression, but would result in the sealant working under tensile loading part of the time.

This compromise of working stress conditions may be optimum. The best time to be conducting sealing operations at about 50% crack opening is form April through early May, but not in fall as suggested in the SHRP manual.

Crack-sealing checklist

Consider six basic facts when choosing the best time to seal cracks:

In the northern hemisphere, crack movement peaks" about the end of February or early March,

Typical crack motion ranges from 0.1875 to 0.75 in.yr.

Cracks kept free of debris will tend to close about 0.06254x wider than the crack width at the beginning of the season.

Sealants applied in March operated in compression, giving maximum protection from water infiltration.

Sealants applied at the end of April and in early May are installed in cracks at about 50% opening, working through a range of compressive and tensile loading.

New techniques and/or materials are needed for efficient crack sealing in late winter or very early spring months.

Ken's Korner

Ken's Korner

Practical tips and helpful information for using computers. Ken Adney can be reached by email at kpa@wsdot.wa.gov or bv phone at 360/705-7539.

Q. I just got hooked up to the Internet & I don't understand it. Where do I start?

A. There are lots of books on the subject (The Dummy's Guide, et. al.). Classes are probably available through your local community college. There are also guides and handbooks available directly on the Internet. Netscape has one at http:home.netscape.com/eng/mozilla/2.0/handbook/. You could also follow the links from http://www.yahoo.com/ to find many more.

Q. The Internet is expanding it's capabilities all the time. What's available for mapping and geographic information systems (GIS)?

A. One of the latest advances in the Internet is the ability to create custom maps. The Interactive Atlas at Mapquest (http://www.mapquest.com/) will let you create customized maps. So will the TIGER Map Service link from the US Dept. of Commerce, Bureau of the Census at http://tiger.census.gov/.

If you are considering getting a Geographic Information System of your own, you may want to take a look at the information available from the Bureau of Transportation Statistics at http://www.bts.gov/cgi-bin/imagemap/HomeBottom?327,54. Washington state's Geographic Information Council can be reached at http://www.wa.gov/gic/gic.html.

Don't neglect to look at the sites for such commercial firms as ESRI (http://www.esri.com/index.html) & SmallWorld (http://www.smallworld-us.com/sworld/home.htm), too.

Q. What are Internet plug-ins?

A. Plug-ins are additional programs that work with your web browser (such as Netscape, Mosaic & Chameleon) to provide access to sounds, movies, animation, spreadsheets and more. Further explanation and reviews of several plug-ins are available at http://www.cent.com/Content/Reviews/Compare/Plugin/.

WRITERS NEEDED FOR YOUR NEWSLETTER

If you are interested in sharing your pavement management stories with the rest of the organization, please think about writing them up for a future NWPMA newsletter. Please include the name of the author and the organization they work for so that they can receive the merit they deserve. We are always looking for stories on successful implementation of pavement management in local agencies in Washington and Oregon. If this is something that would interest you please contact either Dan Sunde at (360) 705-7383 or Paul Sachs at (360) 705-7477. They can assist you in writing an article for the newsletter.

NORTHWEST PAVEMENT MANAGEMENT ASSOCIATION NEWSLETTER POLICY

In an effort lo communicate and advance the goals of the Northwest Pavement Management Association (NWPMA). a newsletter shall be published on a regular basis for distribution to the membership. The newsletter shall act as an open forum to communicate and exchange information consistent with the NWPMA goals within the following general policy guidelines:

Articles

Any article of interest to the membership may be printed. Articles should generally pertain to the construction, reconstruction and/or maintenance of pavements or the activities of the NWPMA. All members are encouraged to submit news articles for publication.

Advertising

No advertising by vendors or consultants will be allowed. Vendors and consultants will be listed in the Calendar of Events portion of the newsletter.

Any special circumstances requiring consideration of an exception to the above guidelines will be discussed on a case-by-case basis between the editor and the NWPMA chairman. The final decision on the content of the newsletter will rest with the current NWPMA chairman.

This policy was adopted on December 10, 1996.